No. 9100056

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Virginia Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS AUTHORIZED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Madison'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 31st *day of* December *in the year of our Lord one thousand nine hundred and* ninety-two.

Attest:

Kenneth A. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Edward Madigan

Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Virginia Agricultural Experiment Station

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
VA. 85-52-24

3. VARIETY NAME
Madison

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
Virginia Polytechnic Institute and State Univ.
104 Hutcheson Hall
Blacksburg, VA 24061

5. PHONE *(Include area code)*
(703) 231-3766

FOR OFFICIAL USE ONLY

PVPO NUMBER
9100056

FILING Date: Dec. 26, 1990
Time: ☐ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $2150.00
Date: Dec. 24, 1990
Certificate Fee: $250.00
Date: December 7, 1992

6. GENUS AND SPECIES NAME
Triticum aestivum L.

7. FAMILY NAME *(Botanical)*
Gramineae

8. CROP KIND NAME *(Common Name)*
Wheat, Common

9. DATE OF DETERMINATION
July 23, 1990

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Agricultural Experiment Station of the Va. Polytech. Inst. & State Univ

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Carl A. Griffey
Crop and Soil Environmental Sciences
Virginia Tech
Blacksburg, VA 24061-0404
PHONE *(Include area code)*: (703) 231-9789

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

a. [X] Exhibit A, Origin and Breeding History of the Variety
b. [X] Exhibit B, Novelty Statement.
c. [X] Exhibit C, Objective Description of Variety
d. [X] Exhibit D, Additional Description of Variety.
e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership
f. [X] Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
g. [X] Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
[X] YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
[X] YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
[X] FOUNDATION ☐ REGISTERED [X] CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act Give date: _____ *)*
[X] NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
[X] YES (If "YES," give names of countries and dates) Sold to certified seed growers in the U.S. by VA. Crop Improvement Association in Fall 1990 and will be offered for sale to U.S. producers in 1991. Not sold outside U.S.
☐ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
James R. Nichols	Dean, Col. of Agr. & Life Sci.	12-11-90
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

9100056

Wheat
'Madison'

14A. Exhibit A: Origin and Breeding History

Pedigree: 'Abe'//'Blueboy'/Va. 71-54-147/3/Va. 72-54-14

The series of crosses from which Madison was derived was completed in 1976. Va. 71-54-147 (C.I. 17449) is a selection from the cross 'Taylor' *2//'Norin 10'/'Brevor'/3/'Thorne' *6/199-4. The 199-4 parent was the F_1 from the cross of 'Asosan'/3/'Supresa'/'Redhart'//'Chancellor' with P55-47.1-5, which was a line in which the leaf rust resistance of Aegilops umbellulata was transferred into 'Chinese Spring'. The mildew resistance of Va. 71-54-147 was derived from Asosan, which carries gene Pm3a. Va. 72-54-14 is a selection from the cross 'Blueboy'/3/'Atlas 50'/1950 Row 223//'Redcoat' or Redcoat sib. The 1950 Row 223 parent had leaf and/or stem rust resistance.

Madison was selected in 1983 as a F_7 headrow, using a modified bulk breeding system. This selection was grown in an observation plot in 1984, and was evaluated in a replicated yield trial in 1985 as entry 24 in test 52. This line, designated as Va. 85-52-24, has been evaluated in the Virginia State Variety Trials since 1986.

A large increase block of Va. 85-52-24, approximately 64 ft. by 66 ft., was planted in 1987, rogued thoroughly for aberrant types, and harvested in 1988. Seed from this block was planted at the Foundation Seed Farm in 1989, and rogued to remove gross off-types. The current lot of Foundation seed (F_{14} generation), derived from this multiplication, still contains a small percentage of aberrant types, primarily later maturing, taller plants with dense heads and blue-colored glumes. These off-type plants do not exceed 5% of the population, are readily identifiable, and are within acceptable limits for seed certification. Madison is genetically stable in the sense that the variety can be maintained and reproduced via seed without changing its characteristics.

Approximately 368 heads were selected from the 1987-88 increase block for use in establishing an improved lot of Breeder seed. These heads were threshed individually, and grown as headrows in 1988-89. Of the 368 headrows, 310 were saved and planted in individual six-row plots, three feet in length. A sample of seed from each headrow was also used to test each row for seedling reaction to a mixture of two mildew cultures, and to a single race of leaf rust. Of the 310 headrows evaluated, 277 had an intermediate reaction to mildew, and were resistant to leaf rust. Upon consideration of greenhouse and field evaluations, 281 of the 310 plots were harvested and bulked. This Breeder seed of Madison was provided to the Foundation Seed Farm, and will be the source of future seed multiplications. Within the limits of biological expectation, the Breeder seed of Madison is uniform and stable.

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PVP APPLICATION NO. 9100056, WHEAT cultivar 'Madison'

Addendum to Exhibit 14A: Origin and Breeding History

Because the initial lot of Foundation Seed of Madison had a small number of variant types (< 5%), a purified, homogeneous lot of Breeder Seed was developed, as described previously in Exhibit 14A, and has been used for the past two years to produce Foundation Seed. This seed stock of Madison is genetically stable and uniform in the sense that the variety can be maintained and reproduced via seed without changing its characteristics.

9100056

PVP APPLICATION NO. 9100056, WHEAT cultivar 'Madison'

Addendum to Exhibit 14B: Novelty of Madison Wheat

Madison is uniquely different from all known cultivars; however, Madison is most similar to 'Massey' wheat. Spikes of both cultivars are fusiform, middense, and awnleted. Glumes of both cultivars are white to cream colored, long, and midwide to wide with predominantly oblique shoulders. Kernels of both cultivars are red, soft, midlong, and predominantly ovate with a narrow crease and rounded cheeks. The Phenol reaction of both cultivars is brown (Class IV).

Madison differs from Massey for the following characters. Glumes of Madison have acute beaks, while those of Massey are obtuse. Kernels of Madison have a middeep crease and a midlong brush, while kernels of Massey have a shallow crease and a long brush. Coleoptiles of Madison are white and anthers are yellow, while those of Massey are purple.

Based on tests conducted from 1986 to 1990 (See Tables 1 & 3 in original application), Madison heads two days earlier than Massey, is two inches shorter ,has better lodging resistance, and has yielded 3 bu/ac more than Massey. Massey has a slightly higher bushel test weight and better milling and baking quality than Madison.

In recent years (1990-1992), Madison has been moderately susceptible (15% disease severity) to powdery mildew, while Massey is moderately resistant (5% disease severity). Madison has the Lr10 and Lr11 genes for leaf rust resistance, while Massey has either Lr1 or Lr10. Both Massey and Madison are resistant to Wheat Spindle Streak Mosaic Virus. Tests conducted at the USDA-ARS Cereal Rust Laboratory indicate that Massey and Madison do not give the same reaction to a set of stem rust differential cultures RTQQ and RKQS, thus indicating that they have different genes for stem rust resistance.

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Virginia Agricultural Experiment Station

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
Virginia Polytechnic Institute and State University
Blacksburg, VA 24061

FOR OFFICIAL USE ONLY

PVPO NUMBER
9100056

VARIETY NAME OR TEMPORARY DESIGNATION
MADISON

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[2] 1 = SPRING 2 = WINTER 3 = OTHER (*Specify*) _____

[1] 1 = SOFT 2 = HARD 3 = OTHER (*Specify*) _____

[2] 1 = WHITE 2 = RED 3 = OTHER (*Specify*) _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[ ][ ][ ] FIRST FLOWERING

[ ][ ][ ] LAST FLOWERING

4. MATURITY (*50% Flowering*):

[0][6] NO. OF DAYS *EARLIER* THAN .....

[0][1] NO. OF DAYS *LATER* THAN .....

[7] [8] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS
7 = TYLER 8 = COKER 916

5. PLANT HEIGHT (*From soil level to top of head*):

[0][9][7] CM. HIGH

[0][7] CM. TALLER THAN .....

[0][8] CM. SHORTER THAN .....

[8] [7] 7 = TYLER 8 = COKER 916
1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (*See reverse*):

[3] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
No hairs on peduncle (on rachis)

[0][3] NO. OF NODES (*Originating from node above ground*)

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[2][3] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness: 1 = ABSENT 2 = PRESENT Short hairs

10. LEAF:

[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER (*Specify*): _____

[1] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[1][2] MM. LEAF WIDTH (*First leaf below flag leaf*)

[2][1] CM. LEAF LENGTH (*First leaf below flag leaf*):

MADISON WHEAT 9100056

11. HEAD:

1- [2] Density: 1 = LAX 2 = DENSE Middense [4] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) Fusiform

[3] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[2] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER (Specify): _____

[0][8] CM. LENGTH [1][1] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.) 8.7 mm

[2] Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.) 3 = WIDE (CA. 4 mm.) 3.4 mm

Oblique to rounded

2, [3] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[2] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[ ] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush. 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED None to slightly collared

[4] Phenol reaction (See instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____

[0][7] MM. LENGTH [0][3] MM. WIDTH [3][8] GM. PER 1000 SEEDS

17. SEED CREASE:

[ ] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI' Narrow

[ ] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI' Middeep

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant) *Genes proposed for said Variety by Cereal Rust Lab St. Paul, MN

[2] STEM RUST (Races) Sr 6, 17, 36, +* [2] LEAF RUST (Races) Lr 10, 11* [0] STRIPE RUST (Races) _____ [0] LOOSE SMUT

[2] POWDERY MILDEW [0] BUNT [2] OTHER (Specify) Wheat Spindle Streak Mosaic Virus

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID (Bydv.) [0] GREEN BUG [0] CEREAL LEAF BEETLE

[1] OTHER (Specify) Hessian Fly Race: L

HESSIAN FLY RACES: [2] GP [0] A [1] B [0] C [0] D [1] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering		Seed size	
Leaf size		Seed shape	
Leaf color		Coleoptile elongation	
Leaf carriage		Seedling pigmentation	

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

6

Madison Wheat

14D. Exhibit D: Additional Description of Madison

Since Madison has not been tested in comparison with any of the six cultivars indicated for wheat in Exhibit C, data on its performance in Virginia over a period of five years (1986-1990) are presented in the tables which follow this section.

Madison was also evaluated in the 1987-88 and 1988-89 Uniform Southern Soft Red Winter Wheat Nursery and in the 1988-89 and 1989-90 Uniform Eastern Soft Red Winter Wheat Nursery. Performance in these nurseries is summarized in the USDA nursery reports compiled by Dr. Harold Bockelman.

Quality evaluations made at the Soft Wheat Quality Laboratory, Wooster, OH, indicate that Madison has good milling and baking properties compared with standard checks. Quality data for Madison are presented in the tables which follow this section.

Table 1. Average Performance of Wheat Cultivars Evaluated in Virginia, 1986-90.†

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GRAIN YIELD
bu/ac

	1990 (6)	1989 (6)	1988 (8)	1987 (6)	1986 (7)	1987-90 (26)	1986-90 (33)
Madison	71	73	87	65	54	74	70
Wakefield	69	80	93	67	58	77	73
FFR 555W	84	79	91	68	----	81	----
Massey	71	73	77	63	51	71	67
Tyler	69	64	71	53	52	64	62
Saluda	70	66	71	57	50	66	63
Florida 302	76	76	82	64	53	75	70
Coker 916	67	65	82	62	50	69	65
Coker 983	75	71	84	66	51	74	69
Coker 833	75	64	75	62	51	69	65
Pioneer 2550	70	64	78	53	49	66	63
Pioneer 2555	68	68	84	60	----	70	----
Pioneer 2548	79	69	----	----	----	----	----
FFR 568	75	69	----	----	----	----	----
L.S.D. (0.05)	4.0	----	8.6	6.5	5.1	----	----

TEST WEIGHT
lbs/bu

	1990 (4)	1989 (6)	1988 (8)	1987 (6)	1986 (7)	1987-90 (24)	1986-90 (31)
Madison	58.1	55.9	58.0	55.4	59.6	56.9	57.4
Wakefield	57.7	55.7	58.3	55.3	59.6	56.8	57.3
FFR 555W	57.9	55.7	58.3	53.8	----	56.4	----
Massey	59.0	57.4	58.9	57.0	60.1	58.1	58.5
Tyler	57.0	55.5	57.9	54.4	58.8	56.2	56.7
Saluda	60.7	57.2	60.2	56.7	62.2	58.7	59.4
Florida 302	57.2	54.2	57.9	54.3	59.1	55.9	56.5
Coker 916	55.8	55.4	58.5	55.6	60.3	56.3	57.1
Coker 983	59.9	57.8	60.2	57.9	61.3	59.0	59.4
Coker 833	58.0	55.6	58.2	56.0	58.6	57.0	57.3
Pioneer 2550	57.5	55.1	58.9	55.0	60.1	56.6	57.3
Pioneer 2555	57.7	54.8	58.2	54.5	----	56.3	----
Pioneer 2548	58.1	54.2	----	----	----	----	----
FFR 568	58.3	56.0	----	----	----	----	----
L.S.D. (0.05)	----	----	1.0	1.2	0.7	----	----

†The number in parentheses below column headings indicates the number of tests on which data are based.

Table 1a. Average Performance of Wheat Cultivars Evaluated in Virginia, 1986-90.†

9100056

DATE HEADED
MAR. 31+

	1990 (3)	1989 (3)	1988 (6)	1987 (5)	1986 (5)	1987-90 (17)	1986-90 (22)
Madison	26	35	34	40	29	34	33
Wakefield	32	38	39	43	35	38	37
FFR 555W	28	38	40	42	—	37	—
Massey	29	37	37	41	33	36	35
Tyler	32	40	41	44	36	39	39
Saluda	28	38	38	41	33	36	36
Florida 302	30	37	38	42	35	37	36
Coker 916	25	33	34	38	28	33	32
Coker 983	29	37	37	42	33	36	36
Coker 833	33	41	42	44	36	40	39
Pioneer 2550	32	39	41	42	36	39	38
Pioneer 2555	28	37	37	40	—	36	—
Pioneer 2548	30	37	—	—	—	—	—
FFR 568	31	38	—	—	—	—	—
L.S.D. (0.05)	—	—	2.0	1.3	2.0	—	—

PLANT HEIGHT
Inches

	1990 (3)	1989 (3)	1988 (8)	1987 (6)	1986 (7)	1987-90 (20)	1986-90 (27)
Madison	36	39	41	41	34	39	38
Wakefield	38	41	43	42	35	41	40
FFR 555W	36	38	41	40	—	39	—
Massey	38	41	43	43	36	41	40
Tyler	39	43	45	43	37	43	41
Saluda	34	36	39	38	31	37	36
Florida 302	39	41	42	41	33	41	39
Coker 916	34	36	39	37	32	37	36
Coker 983	33	35	36	36	29	35	34
Coker 833	38	41	43	42	34	41	40
Pioneer 2550	37	39	42	40	32	40	38
Pioneer 2555	36	38	37	40	—	38	—
Pioneer 2548	35	36	—	—	—	—	—
FFR 568	39	40	—	—	—	—	—
L.S.D. (0.05)	—	—	1.4	1.0	2.0	—	—

†The number in parentheses below column headings indicates the number of tests on which data are based.

Table 1b. Average Performance of Wheat Cultivars Evaluated in Virginia, 1986-90.†

	LODGING %						Winter Survival %
	1990 (2)	1989 (5)	1988 (7)	1987 (4)	1986 (3)	1987-90 (18)	1988 (1)
Madison	13	9	14	35	0	18	100
Wakefield	14	16	21	29	0	20	100
FFR 555W	8	9	8	25	---	13	100
Massey	30	23	27	46	1	32	100
Tyler	16	10	11	25	0	16	100
Saluda	11	21	29	43	0	26	100
Florida 302	6	5	5	35	0	13	25
Coker 916	20	24	19	32	3	24	100
Coker 983	8	10	3	24	0	11	73
Coker 833	21	36	11	31	3	25	100
Pioneer 2550	21	15	22	25	0	21	100
Pioneer 2555	7	6	4	15	---	8	100
Pioneer 2548	6	5	---	---	---	---	---
FFR 568	7	7	---	---	---	---	---
L.S.D. (0.05)	---	---	14	22	---	---	---

†The number in parentheses below column headings indicates the number of tests on which data are based.

Table 2. Reaction of Wheat Cultivars to Diseases in Virginia, 1986-90.†

	Powdery Mildew %					Leaf Rust %				Soilborne Viruses 0-5‡		---- %	----
	1990 (5)	1989 (4)	1988 (7)	1987 (6)	1986 (5)	1990 (5)	1988 (2)	1987 (1)	1986 (1)	1990 (1)	1988 (1)	1987 (1)	1986 (1)
Madison	16	6	1	1	8	3	1	1	17	0	1	1	1
Wakefield	46	7	0	0	5	6	3	22	7	3	60	5	1
FFR 555W	11	3	8	4	----	26	14	15	----	3	40	1	----
Massey	9	4	4	3	1	40	39	38	33	0	1	0	0
Tyler	42	25	32	32	15	37	45	57	47	3	10	10	1
Saluda	56	39	40	40	38	11	15	2	20	5	100	90	70
Florida 302	17	4	5	1	1	4	0	0	1	4	100	80	98
Coker 916	12	8	9	7	2	6	1	4	0	3	100	7	17
Coker 983	2	2	3	1	1	38	3	0	4	3	100	17	1
Coker 833	17	12	18	13	8	0	5	5	0	1	2	1	2
Pioneer 2550	29	14	30	25	20	26	11	6	1	4	63	13	63
Pioneer 2555	34	18	28	24	----	4	0	2	----	4	0	0	----
Pioneer 2548	24	10	----	----	----	1	----	----	----	5	----	----	----
FFR 568	14	5	----	----	----	7	----	----	----	1	----	----	----
L.S.D. (0.05)	----	----	9	10	9	----	13	----	----				

† The number in parentheses below column headings indicates the number of tests on which data are based.

‡ 0=Resistant; 5=Susceptible

Table 3a. Soft Wheat Milling and Baking Quality Evaluations for 'Madison' Wheat, 1987-1989†.

Entry	Milling Qual. Score/ Grade	Baking Qual. Score/ Grade	Test Wt.	Break Flour Yield	St. Gr. Flour Yield	Straight Grade Flour		Micro AWRC %	Cookie Diameter CM.	Top Grain	Soft. Equiv.	Red Passes	Fria-bility	E.S.I.	Mill-ability
						Flour Ash %	Flour Pro. %								
1987 Virginia															
Madison	99.8 B	91.4 C	74.4		71.6	.31	7.4	49.4	18.1	6	61.9				
Saluda (Std.)	100 A	100 A	77.8		70.4	.31	6.9	54.3	18.4	6	68.4				
Tyler	101.8 A	98.7 B	73.3		71.3	.3	6.7	53	18.1	6	67.7				
Massey	101.6 A	94.6 C	76.4		71.7	.33	7.5	53.5	18.2	6	65.4				
LSD			1.17		0.8	0.035	0.56	1.49	0.25	2.06	3.7				
1988 Virginia															
Madison	97 B	117.4 A	61.1	25.7	76.9	.39	9.93	51.3	18.36	5		7	28.6	10.6	110.4
Saluda (Std.)	100 A	100 A	63.2	29.1	76.4	.37	9.7	54.4	17.73	2		7	27.9	10.3	111.1
Tyler	97.1 B	91.9 C	61.8	27.3	76.1	.36	9.34	52.1	17.44	4		7	27.6	11.2	108.7
LSD			0.58	0.748	0.90	0.02	0.54	1.74	0.24	0.83			0.33	0.95	9.22
1989 Virginia															
Madison	102.2 A	97.2 B	75.1		76.2		7.94	50.1	17.54	6	60.2				
Massey (Std.)	100.0 A	100.0 A	76.7		75.4		8.87	55.6	17.9	4	59.8				
Tyler	99.1 B	106.9 A	75.0		75.3		7.61	55.3	18.05	5	60.7				
LSD			1.155		0.81		0.718	1.529	0.239		3.216				

† Milling and baking evaluations performed by the USDA Soft Wheat Quality Laboratory at Wooster, OH.

Table 3b. Soft Wheat Milling and Baking Quality Evaluations for 'Madison' Wheat, 1988-1989†.

Entry	Milling Qual. Score/ Grade	Baking Qual. Score/ Grade	Test Wt.	Break Flour Yield	St. Gr. Flour Yield	Straight Grade Flour		Micro AWRC %	Cookie Diameter CM.	Top Grain	Soft. Equiv.	Red Passes	Fria-bility	E.S.I.	Mill-ability
						Flour Ash %	Flour Pro. %								
1988 Uniform Southern Nursery															
Madison	94.1 C	97 B	61.4	26.7	77.4	.4	8.84	49.6	18.2	4		7	29.5	9.8	114.8
FLA 302 (Std.)	100 A	100 A	61.3	30.3	77.8	.38	8.23	51.8	18.3	5		7	29.9	8.6	123.7
Tyler	92.5 C	99.8 B	60.5	29.8	76.4	.38	8.09	51.5	18.27	4		7	28.6	10.6	110.4
LSD			0.56	0.778	0.91	0.02	0.46	1.66	0.25	2.08			0.35	0.79	10.27
1989 Uniform Southern Nursery															
Madison			58.3	32.9	77.1	.39	8.7	48.8	17.4			7	30.2	9.5	
Tyler			58.6	34.8	75.4	.36	8.5	51.6	17.2			7	28.6	11.2	
1989 Uniform Eastern Nursery															
Madison			58.9	31.9	76.6	.39	9.1	48.9	17.7			7	29.2	10.1	
Cardinal			58.5	35.1	76.8	.36	8.6	51.6	17.6			7	29.1	9.5	

† Milling and baking evaluations performed by the USDA Soft Wheat Quality Laboratory at Wooster, OH.

9100056

PVP APPLICATION NO. 9100056, WHEAT cultivar 'Madison'

14E. Exhibit E: Basis of Applicant's Ownership

The owner of Madison wheat is the Virginia Polytechnic Institute & State University of which the Virginia Agricultural Experiment Station is a part. Employees charged with developing this new cultivar as a condition of their employment understand that ownership rests with Virginia Polytechnic Institute and State University pursuant to university policy on intellectual property.